

REMARKS

This application has been reviewed in light of the Office Action dated June 25, 2003. Claims 1, 3-5, 8, and 9 are pending in this application. Claims 2, 6, and 7 have been cancelled, without prejudice or disclaimer of subject matter. Claims 8 and 9 have been added to provide Applicants with a more complete scope of protection. Claims 1 and 5, which are the independent claims, have been amended to define still more clearly what Applicants regard as their invention, in terms that distinguish over the art of record. Favorable reconsideration is requested.

The Office Action rejected Claims 1-7 under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. In particular, the Examiner deemed the recitation "when a judgment is made that the ink is partially present in said flow path and the ink is not normally supplied" to be new matter.

Claims 1 and 5, as amended, no longer recite the phrase in question. Accordingly, it is believed that this rejection has been obviated and withdrawal thereof is respectfully requested.

Although the claims have not been rejected over the prior art, Applicants would like to present the following comments regarding the art cited in the previous Office Action dated January 27, 2003. In that Office Action, Claims 1, 5, and 7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over European Patent No. 0 920 999 of Imanaka et al. ("EP 0 920 999"), in view of U.S. Patent No. 5,992,984 to Imanaka et al. ("the '984 patent"). Also in that Office Action, Claim 6 was rejected as unpatentable over EP 0 920 999, the '984 patent, and U.S. Patent No. 5,886,713 to Okada et al. ("Okada").

Applicants submit that independent Claims 1 and 5, together with the remaining claims dependent thereon, are patentably distinct from any combination of the previously cited prior art at least for the following reasons.

The aspect of the present invention set forth in Claim 1 is a liquid discharge apparatus including a liquid discharge head having a discharge port for discharging liquid, a liquid flow path communicating with the discharge port and having a bubble generating region for generating a bubble, and a discharge energy generating element for generating thermal energy for generating the bubble in the liquid inside the bubble generating region. A movable member, which has a fixed end and a free end, faces and is spaced apart from the discharge energy generating element. A temperature sensor is provided for periodically detecting, at a predetermined period, a temperature inside the liquid flow path.

One important feature of Claim 1 is a means for controlling or stopping the driving of the discharge energy generating element by judging that the liquid is not normally supplied based on a temperature rise per period detected by the temperature sensor.

EP 0 920 999 relates to a structure in which the temperature in a liquid flow path is detected by a temperature sensor. It is determined that no ink exists in the liquid flow path when a difference between the detected temperature and a baseline temperature is equal to or higher than a predetermined difference. Driving of the heat generating member then is controlled or stopped. However, Applicants submit that nothing in EP 0 920 999 would teach or suggest judging that liquid is not normally supplied based on a temperature rise per period detected by the temperature sensor, as recited in Claim 1.

The '984 patent relates to a structure in which the presence or absence of ink is determined based on the displacement of the movable member when the heat

generating member is driven. The difference in displacement of the movable member between the case in which ink is present and the case in which ink is absent is detected as a change of electrostatic capacitance. When it is determined that no ink is present in the liquid flow path, driving of the heat generating member is stopped. Again, Applicants believe that nothing in the '984 patent would teach or suggest judging that liquid is not normally supplied based on a temperature rise per period detected by the temperature sensor, as recited in Claim 1.

Okada relates to a structure in which ink suction is performed when an internal temperature of a print head is equal to or higher than a predetermined threshold. The temperature of the print head may be measured upon execution of a recording operation. Again, Applicants submit that nothing in Okada would teach or suggest judging that liquid is not normally supplied based on a temperature rise per period detected by the temperature sensor, as recited in Claim 1.

Applicants submit that, at least for the reasons discussed above, any combination of EP 9 020 999, the '984 patent, and Okada, assuming such combination would even be permissible, would still fail to teach or suggest the control unit, as recited in Claim 1. Accordingly, Applicants submit that Claim 1 is patentable over this prior art, taken separately or in any proper combination.

Independent Claim 5 includes the same feature of judging that the liquid is not normally supplied based on a temperature rise per period detected by the temperature sensor, as discussed above in connection with Claim 1. Accordingly, Claim 5 is believed to be patentable for at least the same reasons as discussed above in connection with Claim 1.

The other claims in this application each depend from one of the independent claims discussed above, and, therefore, are submitted to be patentable for at

least the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, individual consideration or reconsideration, as the case may be, of the patentability of each claim on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicants respectfully request favorable reconsideration and early passage to issue of the present application.

Applicants' undersigned attorney may be reached in our New York Office by telephone at (212) 218-2100. All correspondence should continue to be directed to our address listed below.

Respectfully submitted,


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